



Figure 1: Energy profile of Djibouti



Energy Consumption and Production

Djibouti is a small country with a population of 860,000 people (Table 1). The electricity sector in Djibouti has not seen much progress for several decades and the electrification rate is just over 50 per cent (World Bank, 2016). The equipment is old and inefficient so peak production capacity is considerably lower than installed capacity. Most demand is from the city of Djibouti and it has been growing at a high of 5 per cent a year. Forecasts put the maximum energy demand for 2025 at 810 GWh/yr (REEEP, 2012). There have been power interconnections with Ethiopia in recent years, and this has accounted for about 46 per cent of the country's guaranteed electricity production (REEEP, 2012). According to the power sharing agreement, Djibouti only receives surplus energy when Ethiopia has an excess (AfDB, 2013).

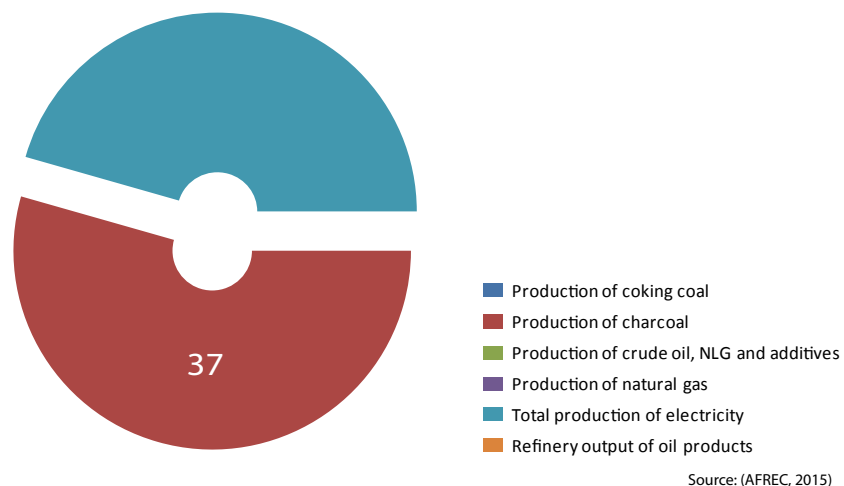
Total electricity production in 2015 was 31 ktoe and final consumption of electricity in the same year was 29 ktoe (Table 2) (AFREC, 2015). Key consumption and production statistics are shown in Figures 2 and 3.

Table 1: Djibouti's key indicators

Key indicators	Amount
Population (million)	0.86
GDP (billion 2005 USD)	1.03
CO ₂ emission (Mt of CO ₂)	0.47

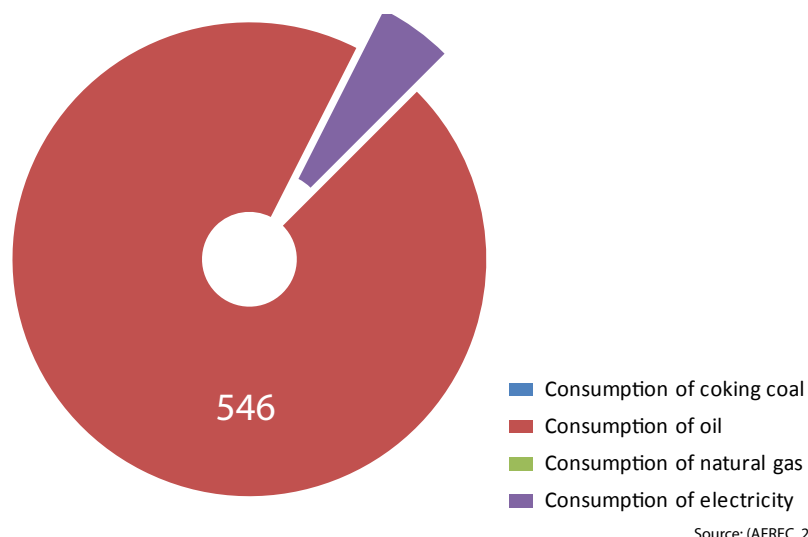
Source: (World Bank, 2015)

Figure 2: Total energy production, (ktoe)



Source: (AFREC, 2015)

Figure 3: Total energy consumption, (ktoe)



Source: (AFREC, 2015)

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Djibouti geothermal project area

Table 2: Total energy statistics (ktoe)

Category	2000	2005	2010	2015 P
Production of coking coal	-	-	-	-
Production of charcoal	0	0	0	37
Production of crude oil, NLG and additives	-	-	-	-
Production of natural gas	-	-	-	-
Production of electricity from biofuels and waste	0	0	0	0
Production of electricity from fossil fuels	15	21	28	31
Production of nuclear electricity	-	-	-	-
Production of hydro electricity	-	-	-	-
Production of geothermal electricity	-	-	-	-
Production of electricity from solar, wind, Etc.	0	0	0	0
Total production of electricity	15	21	28	31
Refinery output of oil products	-	-	-	-
Final Consumption of coking coal	-	-	-	-
Final consumption of oil	562	587	405	546
Final consumption of natural gas	-	-	-	-
Final consumption of electricity	14	19	26	29
Consumption of oil in industry	0	0	0	0
Consumption of natural gas in industry	-	-	-	-
Consumption of electricity in industry	0	0	0	0
Consumption of coking coal in industry	-	-	-	-
Consumption of oil in transport	0	0	0	0
Consumption of electricity in transport	-	-	-	-
Net imports of coking coal	-	-	-	-
Net imports of crude oil, NGL, Etc.	-	-	-	-
Net imports of oil product	563	592	406	468
Net imports of natural gas	-	-	-	-
Net imports of electricity	-	-	-	-

- : Data not applicable

0 : Data not available

(P): Projected

(AFREC, 2015)

Energy Resources

Biomass

There is limited potential for biomass for energy since the country is a semi-desert. However, formal studies need to be carried out on the country's biomass potential (REEEP, 2012).

Hydropower

Djibouti has no hydroelectric potential (REEEP, 2012).

Oil and natural gas

Djibouti has no indigenous sources of oil, natural gas, hydropower or coal.

Coal

Djibouti has no indigenous sources of oil, natural gas, hydropower or coal.

Wind

According to research in the 1980s, average wind speeds across the country are a maximum of 4 m/s highlighting moderate prospects for wind energy. Further studies in 2002 suggested that Goubet near the Gulf of Tadjourah has the potential for a 50 MW wind farm and that Gali Maab Wein and Bada also have significant wind potential (REEEP, 2012). More recently, Qatar Petroleum International has been carrying out a feasibility study for a 60 MW wind power plant near Lake Assal.

Geothermal

The Lake Assal region has been found to have geothermal potential and the government is on course to build a 30 MW geothermal power plant there. Studies to identify other potential resources are also ongoing (REEEP, 2012).

Solar

There is high potential for solar energy exploitation as daily insolation levels range between 5.5 and 6.5 kWh/m² in all areas of the country; the government intends to use this to ensure economic development. Djibouti has a target to extend electricity to 30 per cent of the rural population by 2017 using solar PV (REEEP, 2012). Plans are also in place to use solar energy to power a desalination plant to supply the city of Djibouti. It is estimated that about 40,000 m³/day of salt water will be treated using a hybrid Concentrated Solar Power (CSP) and Reverse Osmosis (RO) plant.

Tracking progress towards sustainable energy for all (SE4All)

Of the population in Djibouti, 53.3 per cent has access to electricity; 13 per cent of rural areas are electrified, with this amount increasing to 65.2 per cent in urban areas (Table 3 and Figure 4) (World Bank, 2016). Access to modern fuels is much higher. In 2012, 13 per cent of people in rural Djibouti were using modern fuels compared with 84 per cent of those in urban areas (World Bank, 2015).

The energy intensity (the ratio of the quantity of energy consumption per unit of economic output) of the Djiboutian economy was 3.5 MJ per US dollar (2005 dollars at PPP) in 2012. The compound annual growth rate (CAGR) between 2010 and 2012 was -24.66 (World Bank, 2015).





The share of renewable energy in the total final energy consumption (TFEC) was 34.8 per cent in 2012. Traditional biofuels formed 34.5 per cent of TFEC. The proportion of renewable sources as a share of electricity capacity was 0.8 per cent in 2012 (World Bank, 2015).

Table 3: Djibouti's progress towards achieving SDG7 – Ensure access to affordable, reliable, sustainable and modern energy for all

Target	Indicators	Year					
		1990	2000	2010	2012	2000-2010	2011-2015
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Per cent of population with access to electricity	43	46	50	53.3		
	7.1.2 Per cent of population with primary reliance on non-solid fuels	79	84	84	84.27		
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption				34.8		
7.3 By 2030, Double the rate of improvement of energy efficiency	7.3.1 GDP per unit of energy use (constant 2011 PPP \$ per kg of oil equivalent)	13.8	-	13.64 (2007)	-		
	Level of primary energy intensity(MJ/\$2005 PPP)	4.8		6.1	3.5	3.77	3.48

Sources: (World Bank, 2015); (World Bank, 2016)

Figure 4: SDG indicators

Percentage of population with access to electricity	Access to non-solid fuel (% of population)	GDP per unit of energy use (PPP \$ per kg of oil equivalent) 2013	Renewable energy consumption (% of total final energy consumption), 2006-2011, 2012
53.3%	84.27%	12.85	34.44%
			

Intended Nationally Determined Contributions (INDC) within the framework of the Paris climate Agreement

Djibouti is considered very vulnerable to the impacts of climate change and thus is keen to participate in activities to reduce or reverse climate change. The country has committed to reducing its GHG emissions by 40 per cent by the year 2030, which translates to about 2 Mt of CO₂e (ROD, 2015). The energy-related Intended Nationally Determined Contributions (INDCs) are shown in Table 4.

Table 4: Djibouti's key aspects/key mitigation measures to meet its energy Intended Nationally Determined Contributions (INDCs)

INDC
*Install 60 MW onshore wind turbines in Goubet by 2025
*Install three solar power plants in Petit Bara, Ali Sabieh and Goubet, with an estimated photovoltaic potential of 250 MW by 2025
*Exploit geothermal energy, whose potential is estimated at 1,200 MW in the region around Lake Assal, Lake Abbé and northern Goubet. The power plants are scheduled to be commissioned in 2030
*Implement energy efficiency project on 10 buildings
*Implement energy saving plan in public buildings
*Study construction of two additional very high voltage lines with a combined capacity of 250 MW in order to import electricity from Ethiopia
*Investigate rehabilitation of 3,000 existing buildings (accommodation and service buildings) each year to improve their thermal performance by means of insulation
*Raise awareness on the use of energy saving lighting equipment (low energy bulbs) in residential areas
*Perform a diagnostic review of the lighting and air conditioning systems used in different administrative buildings
*Improve energy efficiency capacity of the old Cité Ministérielle building and install a photovoltaic solar park on the roof
* Study tidal power plant - Combined production plant for electricity using household waste. Projected potential of 10 MW
*Study additional onshore wind turbines - Djibouti's total wind power potential is estimated at 390 MW. Installation of 11 onshore wind turbines in Goubet to produce 30 MW
*Accelerate air conditioners replacement - Incentives for households to replace their air conditioners at the end of their life cycles with more efficient units. An average of approximately 3,000 annually is projected
*Accelerate refrigerators replacement - Incentives for households to replace their refrigerators at the end of their life cycles by more efficient (Class A) units. An average of approximately 4,500 is projected annually
*Investigate "Green Mosques" – Implement energy efficiency and effectiveness solutions in the country's mosques

Source: (ROC, 2015)

Table 5: Djibouti's institutional and legal framework

Basic Elements	Response
Presence of an Enabling Institutional Framework for sustainable energy development and services (Max 5 institutions) most critical ones	<ul style="list-style-type: none"> • Ministry of Energy and Natural Resources • International Hydrocarbon Company • Électricité de Djibouti (EDD) • Directorate for Rural Electrification in the Agence Djiboutienne de Developpement Sociale (ADDS) • Djiboutian Agency for Energy Management • The Geothermal Energy Development Office • National Energy Commission
Presence of a Functional Energy Regulator	Ministry of Energy and Natural Resources
Ownership of sectoral resources and markets (Electricity/ power market; liquid fuels and gas market)	
Level of participation in regional energy infrastructure (Power Pools) and institutional arrangements	East African Power Pool (EAPP)
Environment for Private Sector Participation	
Whether the Power Utility(ies) is/are vertically integrated or there is unbundling (list the Companies)	
Where oil and gas production exists, whether upstream services and operations are privatized or state-owned, or a mixture (extent) e.g., licensed private exploration and development companies)	
Extent to which Downstream services and operations are privatized or state-owned, or a mixture (extent)	Imports are dominated by Shell, Total and Oil Libya.
Presence of Functional (Feed in Tariffs) FIT systems	
Presence Functional IPPs and their contribution	Ethiopian Electric Power Corporation and EDD have a joint PPA.
Legal, Policy and Strategy Frameworks	
Current enabling policies (including: RE; EE; private sector participation; & PPPs facilitation) (list 5 max) most critical ones	<ul style="list-style-type: none"> • National Strategy and Action Plan for the electricity sector • Djibouti National Energy Master Plan • Renewable Energy Fund
Current enabling laws/pieces of legislation (including: RE; EE; private sector participation; & PPPs facilitation) – including electricity/grid codes & oil codes (5 max or yes/ no) most critical ones	<ul style="list-style-type: none"> • Decree 83-071/ PWEDD of 2 February, 1983 establishing the EDD • Presidential Decree 11 2009-0218/MERN October 2009 established the National Energy Commission • Law 32/AN/13/7ème L January 20, 2014 established the Geothermal energy Development Office • Electricity law is under preparation

This table was prepared with material from (MMEH, 2013); (REEEP, 2012) and (WTO, 2013)

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Institutional and Legal Framework

The Ministry of Energy and Natural Resources is in charge of the energy sector and is also the sector regulator (Table 5). The Électricité de Djibouti (EDD) is the sole generator, transmitter and distributor of electric energy. On a regional level, the country is a member of the East African Power Pool. An Electricity Law is under preparation. The Djibouti National Energy Master Plan and the National Strategy and Action Plan for the



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